

1 TO WHOM IT MAY CONCERN:

2

3 BE IT KNOWN THAT I, OLIVER JOEN-AN MA, a
4 citizen of the United States of America, residing in
5 Arcadia, in the County of Los Angeles, State of
6 California, have invented a new and useful improvement
7 in

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9 LIGHT PROVIDING APPARATUS ATTACHABLE

10 TO UMBRELLA AND STAND ASSEMBLY

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BACKGROUND OF THE INVENTION

 This invention relates generally to light transmission from an umbrella and stand locations, and more particularly to apparatus attachable to an umbrella stand to achieve such illumination.

 It is a common practice for ordinary people to use a garden umbrella in various outdoor resting/dining areas as a means to shade sunlight or to block rain drops when spending their leisure time outdoors. Hence, in this way a comfortable and relaxing environment can be provided. At present, since there is no lighting device specifically designed to be used with a garden umbrella when the surrounding lighting condition becomes dim, and people tend to improvise by attaching a corded lighting device to the umbrella to provide sufficient lighting to adjacent area. Nevertheless, although this type of lighting device is readily available, the disadvantages for using a corded lighting device in this way often poses a hazardous situation to people moving around in this area, because of the dangling electrical cord; and further the hanging electrical cord gives an undesirable contrast to the nature background which can easily ruin the relaxing atmosphere.

1 There is also need at umbrella and stand
2 locations, such as patios, for controlled illumination,
3 associated with selected individual umbrella locations,
4 instead of general illumination of the entire area. It
5 appears that no way was previously known to achieve
6 these objectives in the novel and unusual manner, and
7 with unusual results, as are now provided by the
8 present invention.

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10 **SUMMARY OF THE INVENTION**

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12 It is a major object of the invention to
13 provide apparatus and method to meet the above need.
14 Basically, the invention is embodied in a light
15 provider for an umbrella and stand assembly, and that
16 comprises:

17 a) a body releasably attachable to the
18 assembly,

19 b) a source or sources of electric light
20 carried by the body, to direct such light away from the
21 body,

22 c) and incident light responsive means on
23 the body to provide electrical energization for the
24 light source, said means configured to receive incident

1 light from a direction or directions spaced away from
2 light directed from said source or sources.

3 As will appear, the carrier body
4 advantageously includes multiple sections that become
5 interconnected when the body is attached to the
6 assembly stand, whereby quick mounting or de-mounting
7 of the light provider is made possible.

8 It is an objective of the present invention
9 to solve all technical issues to meet the need for the
10 referenced need by providing a portable, multi-purpose
11 lighting device which can be easily fastened to , as
12 well as un-fastened from, a pole-like object such as an
13 umbrella stand, and without the trouble of having an
14 electrical cord hanging undesirably from it.

15 The present invention achieves desired
16 objectives by providing a multi-purpose lighting device
17 comprising a plurality of base parts, preferably a
18 lighting means integrated to each base part, and a
19 power supply part. The present invention in one form
20 is characterized by two structurally divided base parts
21 A and B, each having a semi-circularly curved inner
22 sidewall surface facing that of the other and in which
23 a circular through hole is formed when the two base
24 parts A and B are joined together. The present
25 invention is further characterized by having a solar
26 power charging part and a grip locking means for

1 gripping to a pole-like structure when said two base
2 parts are coupled together while regulating gripping
3 tension at the same time.

4 Another object is to provide the incident
5 light responsive means in the form of a solar cell or
6 cells, and said light source or sources comprise an LED
7 or LEDs. The LEDs may be provided in clusters received
8 in light reflecting receptacles, for producing
9 concentrated light beams, the intensity and/or color of
10 which may be controlled.

11 Another object includes provision of a
12 carrier body central opening to receive the umbrella
13 stand. The body may include multiple sections that
14 become interconnected when said body is attached to the
15 assembly stand. At least two sections may have hinged
16 interconnection, whereby the sections are clampingly
17 connected to the stand.

18 Additionally, a stand gripper or grippers may
19 be provided at the central opening, and carried by the
20 body; and the two body sections may respectively carry
21 two grippers, with a spring or springs urging at least
22 one gripper toward the other, to grip the stand
23 therebetween. Stands of different diameters can
24 thereby be gripped.

25 Latch elements may be carried by the body
26 sections to latch together when the sections are closed

1 about an umbrella stand; and a latch release may be
2 provided on one section. The construction enables
3 inverting of the carrier body, to direct light upwardly
4 or downwardly.

5 Typically, a grip locking means is provided
6 to include a gripping claw, a sliding block, a crank
7 handle, and a transmission part substantially connected
8 to said crank handle; wherein, a slot is integrally
9 formed inside each of the above-mentioned base part for
10 slidably receiving said sliding block. Preferably, the
11 grip locking means further comprises two threaded
12 pillar parts substantially perpendicular to the
13 coupling surface for rotatably driving said sliding
14 block and transmission part. The gripping claw is
15 securely coupled to the sliding block which enables
16 inward or outward sliding movements of the gripping
17 claw along longitudinal direction of said slot. Thus,
18 gripping tension of said gripping claw can be suitably
19 adjusted when gripping to a pole-like object by
20 suitably adjusting the extension of said gripping claw
21 protruding from the slot of said coupling surface.

22 The solar power charging part comprises a
23 plurality of solar panels formed on a base part, and
24 each solar panel is electrically connected to a solar-
25 charging circuit part in the base part by means of
26 wires.

1 The base part preferably includes a circular
2 disk shape, wherein, a circular hole is formed through
3 the center of the base part by having two structurally
4 divided base parts A and B, combined together having a
5 symmetrical semi-circularly curved inner sidewall
6 surface facing that of the other.

7 The two divided base parts A and B may be
8 hinged together along corner edges while the other
9 corner edges are bound together by means of a separable
10 buckling part, preferably.

11 The transmission structure may comprise a
12 larger first gear and a pair of smaller second gears
13 both engaging said first gear. The first gear is
14 mounted inside a gear box part by means of an axle part
15 while the second gears drive a threaded pillar part.

16 The sliding block and the gripping claw may
17 both be of rectangular shape. A curved gripping
18 surface is formed on the gripping claw such that a
19 gripping teeth profile is preferably formed on the
20 curved gripping surface. Furthermore, a longitudinal
21 extending recessing strip formed on each side wall of
22 said slot slidably receives a corresponding
23 longitudinal extending protruding strip formed on each
24 side wall of the sliding block.

25 The lighting means is preferably a battery-
26 powered high luminance LED lamp. Compared with the

1 prior lighting devices, the present invention has the
2 advantage of comprising a locking means capable of
3 regulating gripping tension of said gripping claw to
4 achieve firm grip to a pole-like object of different
5 circumferential dimensions. Furthermore, the locking
6 means is easy to be positioned, installed and
7 uninstalled.

8 The present invention has another advantage
9 of using a solar power charging part for charging a
10 rechargeable battery directly which provides a safer
11 and easier use of the device. Additionally, said
12 rechargeable battery part is equipped with a corded
13 charging unit, and the rechargeable battery is
14 preferably concealed inside the base part.

15 These and other objects and advantages of the
16 invention, as well as the details of an illustrative
17 embodiment, will be more fully understood from the
18 following specification and drawings, in which:

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20 **DRAWING DESCRIPTION**

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22 Fig. 1 is an elevation view of light
23 providing apparatus incorporating the invention,
24 supported on an umbrella stand;

1 Fig. 2 is a view like Fig. 1, but showing the
2 apparatus of Fig. 1 in inverted position;
3 Fig. 3 is an enlarged, top plan view of the
4 Fig. 1 apparatus;
5 Fig. 4 is an elevation view taken on lines 4-
6 4 of Fig. 3;
7 Fig. 5 is an enlarged, bottom plan view of
8 the Fig. 1 apparatus;
9 Fig. 6 is a fragmentary view showing the
10 apparatus in disconnected condition, with latch guide
11 elements protruding;
12 Fig. 7 is an elevation taken on lines 7-7 of
13 Fig. 6;
14 Fig. 8 is a view like Fig. 7, but showing the
15 latch elements in connected condition;
16 Fig. 9 is an elevation view taken on lines 9-
17 9 of Fig. 7, showing female latching elements;
18 Fig. 10 is an elevation view taken on lines
19 10-10 of Fig. 7, showing male latch elements;
20 Fig. 11 is a fragmentary plan view showing
21 umbrella stand grippers, engaging a stand of lesser
22 diameter;
23 Fig. 12 is a view like Fig. 11, showing the
24 grippers engaging a stand of relatively larger
25 diameter;
26 Fig. 13 is a circuit schematic;

1 Fig. 14 is a section showing LED clustering
2 within a light reflector;

3 Fig. 15 is a schematic diagram of another
4 form of the present invention;

5 Fig. 16 shows a cross-sectional view of Fig.
6 15 along an A-A dissecting plane;

7 Fig. 17 shows a cross-sectional view of Fig.
8 15 along a B-B dissecting plane;

9 Fig. 18 shows a cross-sectional view of Fig.
10 15 along a C-C dissecting plane;

11 Fig. 19 shows a bottom view of a device
12 embodying the present invention with both divided base
13 parts A and B bound together as a whole;

14 Fig. 20 is a frontal view showing
15 schematically the application of a device embodying the
16 present invention to or on umbrella structure;

17 Fig. 21 shows an exploded perspective diagram
18 of a divided base part of the present invention; and

19 Fig. 22 is a side elevation view of a
20 modified device.

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22 **DETAILED DESCRIPTION**

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24 In Figs. 1 and 2, an umbrella 10 is supported
25 in a central stand 11, projecting from a base 12. The

1 stand may or may not have an upper section 11a which
2 can be tilted, at joint 14. An optional table is
3 indicated at 13.

4 In accordance with the invention, a preferred
5 light provider or fixture 15 is installed in supported
6 position on the stand section 11b. In Fig. 1, light
7 beams 15a are directed downwardly, away from body 16 of
8 the light provided; and in Fig. 2, light beams 15b are
9 directed upwardly away from the inverted body 16. A
10 source or sources 18 of projected light are carried by
11 the body 16, and may comprise clusters 18a of LEDs, as
12 shown in Fig. 5. Such clusters are spaced about the
13 stand axis 20; and each cluster may comprise between 2
14 and 8 LEDs, as shown. Receptacle shaped reflectors 21
15 re-direct light rays from the LED clusters downwardly
16 in Fig. 1, and upwardly in Fig. 2. See also Fig. 14.
17 The LEDs are protectively received in the receptacles
18 which are sunk into the body 16, from surface 16a.
19 Concentrated beams are produced by the multiple
20 clustered LEDs.

21 Figs. 3 and 4 show one form of incident light
22 responsive means on the body to provide for electrical
23 energization of the light source or sources 18. That
24 light responsive means is typically configured to
25 receive incident light from a direction or directions
26 22a in Fig. 1, and 22b in Fig. 2, spaced away from

1 light beams 15 and 15b from the source or sources.
2 Such incident light is typically ambient daytime light.
3 Fig. 13 shows ambient light rays 22a or 22b incident
4 upon a solar cell or cells 26. The latter generate
5 electricity transmitted as by circuit 27 to the LED
6 light sources 18. A dry cell battery or batteries 29
7 may be incorporated in circuit 27 to store electricity
8 generated by cell or cells 26 as during daytime; and a
9 control switch 30 may be operated to cause circuit 27
10 to deliver electricity from the battery or batteries to
11 the LEDs. Elements 18, 26, 27, and 29 are carried on,
12 within, or by invertible body 16. As shown in Fig. 13,
13 solar cells 26 have upwardly facing inlets 26a, at
14 upper side 16c of body 16; and LEDs 18 generate light
15 rays that are transmitted downwardly and away from the
16 lower side 16d of body 16, as in Fig. 1. Fig. 4 shows
17 a receptacle 90 on the body to receive AC current, to
18 energize the LEDs, if desired.

19 See also Figs. 3 and 4 showing multiple solar
20 cells 26 spaced clockwise about the body or stand
21 central upright axis 20; and also see Fig. 5 showing
22 the LED clusters 18a and reflectors 21 spaced clockwise
23 about the axis 20, for concentrating the LED light in
24 beams transmitted from the reflectors.

25 Also shown in Fig. 13 is a remote control
26 means 80, connected as by wiring 81 (or a radio link)

1 with circuit 27, for controlling the intensity and/or
2 color of light transmission from the LED or LEDS.
3 Switch 30 enables switching power to lights 18 from
4 solar cell energization, to battery power energization
5 to household AC energization.

6 Preferably, the body 16 is comprised of two
7 sections, as shown at 16e and 16f in Figs. 3-7. Those
8 sections may have semicircular peripheries, as at 36
9 and 37, and flat sides 36a and 37a that interface when
10 the body sections are closed together about the stand,
11 as enabled by hinge connection of the bodies as at 40.
12 When the sections are closed together, the stand
13 becomes attached or clamped to the stand frictionally,
14 in such manner as to allow quick release, or adjustment
15 of the body 16 along the stand, or removal from the
16 stand, or inverting of the body and attachment to the
17 stand or pole as in Fig. 2.

18 As shown in Figs. 5, 11 and 12, grippers 50
19 and 51 are carried by the body sections to grip the
20 stand, when the sections are closed together. The
21 grippers may have serrated edges as at 50a and 51a to
22 frictionally grip or clamp the stand. Compression
23 springs 52 and 53 urge the grippers toward the stand,
24 the grippers being slidable in recesses 54 and 55 in
25 the body sections. This also accommodates stands of

1 different diameters, as in Figs. 11 and 12, to which
2 the device may be readily attached.

3 Figs. 6-10 show the provision of a latch or
4 latches 60 protruding from section 16e and receivable
5 in slots 61 formed in body section 16f, as the two
6 sections close together. Fig. 7 shows that latches 60
7 are carried on a plunger 62 movable in a guide groove
8 or grooves 63 and 64, parallel to axis 20. When the
9 sections are closed together, latches 60 are cammed
10 downwardly at keeper shoulders 65 and 66, the plunger
11 62 then downwardly compressing a spring 67. Upon full
12 closure of sections 16e and 16f, the latches hook into
13 keeper recesses 68 and 69. A protruding release button
14 70 is manually operable upon being pushed, to move the
15 plunger and latches downwardly, allowing their removal
16 from recesses 68 and 69, and spreading apart of the
17 body sections 16e and 16f, to release the carrier body
18 from the stand. A guide protrusion 85 may be provided
19 on section 16f, to fit into guide recess 86 in section
20 16e to assist in orienting the sections 16e and 16f
21 during closure.

22 Body sections 16e and 16f have cover plates
23 16e' and 16f' which may be upwardly convex or domed.

24 As shown in Fig. 15, another form of the
25 present invention seen at 99 comprises a base part 101,

1 a lighting means 102, a locking means 103, and a solar
2 power charging part 104. See also solar windows 104a.
3 Furthermore, the base part 101 is preferably of
4 circular disk shape comprising a symmetrically divided
5 first base part 111 and a second base part 112 each
6 having a semi-circularly curved inner sidewall surfaces
7 115 and 116 facing that of the other in which (when 111
8 and 112 are closed together) a circular through hole
9 119 is formed to substantially encircle a pole-like
10 object 200 when said two base parts 111 and 112 are
11 jointly bound together. See Fig. 18. The two base
12 parts 111 and 112 are connected together by means of a
13 hinge part 113 along a corner edge of each base part
14 while the other corner edges are coupled together by
15 means of a separable binding part 114 for ease of
16 binding and un-binding. A perpendicular slot 117
17 extending inwardly through each of the inner sidewall
18 surfaces 115 and 116, to slidably receive a locking
19 means 103 for gripping to a pole-like object of
20 different circumferential dimensions.

21 Preferably, the lighting means 102 of the
22 present invention comprises a plurality of high
23 luminance LED lamps evenly distributed on the base part
24 101, to which the electrical power of each LED lamps is
25 supplied by a rechargeable battery 143 seen in Fig. 18.

1 Each rechargeable battery 143 is concealed in a
2 corresponding battery holder in the base part 101.

3 Typically, the rechargeable battery 143 is
4 recharged with a corded charging unit. It is a feature
5 of the present invention to use a solar power charging
6 part 104 for charging a rechargeable battery directly.
7 That solar power charging part 104 comprises a
8 plurality of solar panels 142 formed on the base part
9 101, and each solar panel is electrically connected in
10 series to a solar-charging circuit part 141 in the base
11 part by means of wires 144. The solar panels 142
12 collect solar energy to be converted by the solar-
13 charging circuit part 141 to electrical energy for
14 supplying power to the rechargeable battery 143. Each
15 solar panel 142 is inserted and bonded inside a recess
16 118 of the base part 101 as shown in Fig. 2.

17 Referring to Fig. 2, said locking means 103
18 is preferably fixed inside the perpendicular slot 117
19 of the base part 101 for gripping to a pole-like object
20 of different circumferential dimensions. The locking
21 means 103 further comprises a gripping claw 138, a
22 sliding block 137, a crank handle 131, a plurality of
23 threaded pillar parts 136, and a transmission part.
24 The transmission part preferably comprises a gear
25 mounting part 132, a larger first gear 133, a pair of
26 smaller second gears 134 both engaging said first gear

1 133, and an axle part 135. The gear mounting part 132
2 may be fixed to the base part 101 by means of screws.
3 The first gear 133 is rotatably fixed to the gear
4 mounting part 132 by means of the axle part 135, while
5 the second gears 134 drive the threaded pillar part
6 136. An open end of the axle part 135 is coupled to
7 the crank handle 131. The perpendicular slot 117 is
8 integrally formed inside each of the first and second
9 base parts 111 and 113 for slidably receiving sliding
10 block 137. Typically, the two threaded pillar parts
11 136 rotatably drive sliding block 137.

12 As seen in Fig. 21, a longitudinal extending
13 recessing strip 172 formed on each side wall 171 of the
14 perpendicular slot 117 slidably receives a
15 corresponding longitudinal extending protruding rail
16 372 formed on each side wall of the sliding block 137.
17 Sliding block 137 further comprises a plurality of
18 threaded through holes 371 (see Fig. 16) which
19 preferably are two in number in this embodiment. Each
20 threaded through hole 371 receives a threaded pillar
21 part 136 by means of such thread. Second gears 134
22 enable inward or outward sliding movements of the
23 sliding block 137 along the longitudinal direction of
24 the perpendicular slot 117 through rotation of the
25 threaded pillar parts 136. The gripping claw 138 is
26 securely coupled to the sliding block 137 by means of

1 screws. Typically, the sliding block 137 and the
2 gripping claw 138 are both of rectangular shape.

3 A concavely curved gripping surface is formed
4 on the gripping claw 138 such that a curved gripping
5 teeth profile 381 is preferably formed on the curved
6 gripping surface. The gripping claw 148 is securely
7 coupled to the sliding block 137 which slides along the
8 longitudinal direction of 117 which extends normal to
9 the device axis. Thus, gripping tension of said
10 gripping claw can be suitably adjusted when gripping to
11 a pole-like object by suitably adjusting the extension
12 of said gripping claw 148 protruding from the
13 perpendicular slot 117 of said coupling surface.

14 Fig. 20 shows the device 99 attached to stand
15 200 supporting umbrella 98. Fig. 22 shows a modified
16 device 199, like 99, but upwardly domed at 198 so that
17 light receiving windows 197 are angled to efficiently
18 receive light from under the edges of the umbrella.

19 Although the present invention has been
20 explained by the embodiments shown in the drawings
21 described above, it should be understood to the
22 ordinary skilled person the art that the invention is
23 not limited to the embodiments, but rather that various
24 changes or modifications thereof are possible without
25 departing from the spirit of the invention.
26 Accordingly, the scope of the invention shall be

1 determined only by the appended claims and their
2 equivalents.

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